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*Royal College of Physicians
from the Author*

REMARKS

ON

Fish Poisons,

BY

EDWARD D. ALLISON, M.D. &c.

*Extracted from the Scotsman, August 8th; Courant, August
16th; and Observer, October 12th, 1827.*

TO THE EDITOR.

SIR,

A statement* lately appeared in your paper regarding the

* LEITH.—On Thursday evening this town was thrown into great consternation, in consequence of a report that several families were suffering dreadfully from the effects of eating mussels, impregnated with the corrison of copper; which, upon inquiry, turned out to be true. The circumstances are shortly these :—The Western Wet Dock is undergoing considerable repairs, for the accomplishment of which the water was lately pumped out, when the sides of the basin were discovered to be lined with mussels of a very large kind; some decayed timber was also taken out of the Dock, to which a number were attached. For these some days past those have been gathered by children and poor people, the fatal effects of which we hasten to describe.—A poor woman brought some of them home to her house, in North Leith, on the above day, about one o'clock, which were immediately boiled, and eaten by her husband, herself, and two children; in a short time they were simultaneously seized with violent spasms in the stomach. Upon the alarm being given, and the cause being ascertained, it was found that this was by no means a solitary case, numbers in different parts of the town being seized in the same way; indeed, all who partook of the mussels have suffered considerably. The woman lingered till about five o'clock in great agony, when she expired, notwithstanding the prompt

poisoning of several individuals in this town, in consequence of having eaten largely of mussels, which had been picked from the Wet Docks, and which were asserted to contain a portion of copper.

In order that I might avoid every appearance of inconsiderateness, I have hitherto delayed taking any notice of the statement, but as the subject is important, either as it regards science in general, or the peculiar properties of the mussel in question; and, as the statement has been copied uncontradicted into every Journal, I believe, in Britain, I feel myself bound to submit a few observations and facts to demonstrate that the conclusions, so universally drawn, are altogether fallacious. The subject is, indeed, more calculated for a Medical than a Public Journal, but as the statement first appeared in the latter, it is not my fault if they are again resorted to. There can be no doubt that several persons who had partaken of mussels were injured; and that these mussels were taken from the Wet Docks; but that these persons were injured because the mussels contained a preparation of copper; and that they had imbibed or absorbed this poison from being in the Dock, where there are from time to time vessels with coppered-bottoms, are two conclusions opposed by fact. The whole rests upon theory, and which an appeal to experiment, either analytical or synthetical, cannot substantiate; and is equally contrary to the observations of eminent men, in all ages of the world, who have studied the nature of fish poisons.

It still remains to be proved, that fish of any description can live in waters impregnated, however slightly, with copper; and therefore a strong presumption exists that, if the dock mussels had been immersed in water so saturated, they could not have lived in it, but must inevitably have died. If

attendance of the medical gentlemen of the town. A man belonging to the Glass-houses, after partaking of the mussels was similarly seized, and died on the same day. Although a great number of families, as already stated, were from Thursday night to Friday forenoon in imminent danger, yet it is to be hoped that most of the sufferers will soon recover.—*Scotsman*, June 23, 1827.

they contained such a quantity of copper as to have poisoned 30 or 40 persons, as reported, it is not to be doubted that the same quantity or even much less, must have proved fatal to themselves : besides in such a case, their colour as well as their taste must have been distinctly changed, and could not have escaped the notice of those who had partaken of them. It is likewise evident, that if the theory was true, there must have been an immense quantity of copper in the docks, to have so very strongly impregnated the large mass of water in them, and that the water must have been stationary in order to have allowed the impregnation from the copper to have been effected. Now, it is not a difficult matter to prove that neither casualties have existed. There are very few vessels with copper sheathing at any time in either of the docks, and their stay is not of long duration. The constant flux and reflux of fresh sea-water at every tide, particularly in stream tides, precludes the possibility of any of the copper on the vessels so saturating the dock water as to permit the mussels to absorb such a quantity of copper in its metallic state, as might prove deleterious to the human system.

To avoid, however, any mistake, I have analysed most carefully, and with the finest tests, several mussels of the same kind as were consumed, also taken from the wet docks, and the results corresponded with my previous conjecture : not the slightest indication of the presence of copper could be detected. But admitting for one moment, that the water had been saturated with this metal, it does not necessarily follow, that the mussels had absorbed any of it. It is quite possible to conceive that they could, in a way peculiar to themselves, extract for their growth the salubrious portions of the fluids only, in the same manner as bees extract honey from poisonous plants. It is in vain to attempt to get rid of these facts ; some other explanation must therefore be sought, and may, I think, be obtained. For several days previous to the mussels being removed, the greater portion of the water in the west dock (the one nearest Newhaven) had been allowed to escape ; the communication between the two docks was then closed at the middle bridge, and the residuary water was pumped off. The dock was thus left empty for several days ;—the rays of as powerful a sun as had been en-

joyed during the summer, passed directly upon the mussels, which were generally attached to the north side of the dock;—there are no buildings to intercept or moderate the solar influence—indeed the burning sun glared right upon the mussels; of course, being left perfectly dry for many days in such an exposed situation, they must have become sickly or diseased: or have lost, or nearly so, their vitality and bordering upon a state of putrefaction; and their age, too, as marked by their large size, must have favoured such a tendency, and made them of more difficult digestion than those which are generally used. They were thrown upon the quay by the labourers along with mud and filth, from the bottom of the dock, and were in this state again exposed to the hot sun. Out of this filthy mass they were taken home, and probably, kept several hours in a warm apartment previous to their being eaten largely of as diet. The corrupting effect of heat upon lamb, &c. will illustrate at once the state in which the mussels must have been when partaken of; and need any person wonder that the fish were not only unwholesome, but absolutely poisonous in a very high degree? Although I was not so fortunate as to witness any of the cases, I am possessed of sufficient facts to conclude, that the symptoms were not those which present themselves when copper has been administered. The peculiar effect of copper is instant vomiting, for which purpose it is frequently exhibited in cases of poisoning, but here no bad symptoms appeared for several hours; a powerlessness of the lower extremities, and feeling of tightness at the neck, in one of the cases, were first experienced, after a sleep of some duration. In another case, the feelings of uneasiness were removed, from an emetic clearing the stomach of the undigested fish, a result which could not have taken place if any portion of the metal had been absorbed into the system.

Post mortem examinations of the two fatal cases did not, I understand, afford much information. No inflammation of the stomach or intestines, or any deviation from the usual appearance, could be discovered; the mussels were found undigested in the stomach, and were not subjected to any

chemical analysis. The want of urticaria is no evidence that the injury proceeded from the absorption of copper, as it is frequently absent in cases unequivocally originating from fish, &c.

The symptoms may be referred to one or two causes: 1st, The indigestible nature, and corrupt state of the fish, inducing cholera morbus; or, 2dly, From a peculiar unknown property in the mussels themselves.

Cholera morbus is by no means a rare disease from indigestible substances, particularly when taken during the summer, when the system is in a state of extreme relaxation. Not a season passes but it is met with. It is quite common after the use of crabs or partons, and requires the most prompt treatment on the part of the physician, otherwise death rapidly ensues. Avicenna, (*a*) an Arabian physician of the 11th century, forbids the use of fish after laborious employment; and it is therefore a curious fact, that one of the persons who died lately, was by profession a glass blower. The peculiarly deleterious properties of mussels, in certain circumstances, has long since been remarked in places and climates where the influence of copper could not reach.

The doctrine of absorption of copper is not indeed new, but it is now universally denied by medical men of reputation. The ancients, as Hippocrates (*b*), Celsus (*c*), and Porcius Cato (*d*), were well acquainted with the stimulating properties of mussels.

Amongst the moderns, I may refer to the very celebrated Linnæus (*e*). The words of this great author are, "*Mytilus edulis incola plebeiis, concoctu difficilimus, etiam cepis additis, certis anni temporibus, an ab asteria ophiuro comes-to? venenatus.*" Van Swieten says, "*Dum mala fortuna*

(*a*) Can. Med. 101, cap. 7.

(*b*) Hippocrates, De Dieta, lib 2, cap. 19.

(*c*) Celsus, lib. 2, xxix.

(*d*) Porcius Cato, R. R. cap. 158.—Pliny, 32. 5.

(*e*) Syst. Nat. 3354—Gesner, 227.

venenatum mytilum quis devoravit, summa sequitur, nunc citius, nunc serius, anxietas; dato vitriolo albo simili alio emetico quod ilico vomitum facit, illico cessant omnia mala" (*f*). Blumenbach alludes to *Mytilus edulis*:—"Un manger peu sur, qui quelquefois a empoisonné (*g*)."
 Bateman remarks (*h*), "On some parts of the coast of Yorkshire, where mussels are abundant, a helief is prevalent that they are poisonous, and they are consequently never eaten. 'This opinion is more probably the result of traditional observation.'
 "A case, indeed, is mentioned by Valentinus, in which a man died so suddenly after eating mussels, that suspicion of having administered poison fell upon his wife." Willan, (*i*) speaking of the *urticaria febrilis*, writes, "Modifications of this disease are produced by certain articles of food, which, in particular constitutions, are offensive to the stomach, especially by shell fish, such as lobsters, crabs, and shrimps, but above all by mussels." Mr Plumbe says, (*k*)
 "The poisonous properties of fish, in a particular state, not well understood, is the most common cause of febrile nettle-rash. Mussels and lobsters seem to have been most frequently possessed of this property, and several fatal instances have occurred of their deleterious power. The general impression seems to be, that the commencement of the putrefactive stage in the fish generates the poisonous properties in question; and, from my own observation, in one or two cases, I am inclined to consider this to be the fact. The common classes of people, both men and women, attending the fish markets, are constantly affording cases of this kind; and, indeed, it is so common as to create but little alarm. It is generally ascertained to have been produced in such cases by eating the refuse of the market, or the cheaper kind of shell-fish, particularly mussels. The

(*f*) Commentaria, tom 11, 198. 9.

(*g*) His. Natur. tom, 2. 50.

(*h*) Mehring de Mytilorum Veneno. Oegrot iii. in Haller's Disput, tom. 3, p. 191.

(*i*) Edition of Willan, 89.

(*k*) Practical Treatise, London, 1824; and Dr Burrow's Pamphlet on Fish Poisons.

poisonous properties in question are by no means confined to the fish of this climate, it is more common, as well as more violent, within the tropics, both in the neighbourhood of land, and many degrees out at sea ; and hence an important obstacle arises to the belief of its dependence on any particular species of maintenance which the fish may have obtained.”—“ No foundation exists for the belief that any part of it can be eaten with safety when another is tainted; pickling does not destroy the poison”—“ The idea that impregnation of the circulation and solids of the animal with copper is consistent with life, is in itself exceedingly absurd, and yet among the various strange conjectures as to the cause of the poisonous properties of fish, this is spoken of by scientific men as the most rational explanation of the fact.”—“ The following symptoms are stated to have occurred in fatal cases from eating mussels—sickness, and vomiting of a great quantity of dark-coloured matter, and subsequently of a dark green fluid: the urticaria covered the skin, and was attended by intolerable itching, great difficulty of breathing came on the second day; tormina, intense thirst, and swelling of the abdomen and face followed, and the extremities gradually became cold and benumbed, the countenance became of an ashy paleness, and the pupils were extremely dilated, respiration difficult, insatiable thirst, quick, low, and tremulous pulse, and subsultus. In one instance death next, preceded by severe convulsions. The fish were obtained in these cases under circumstances unequivocally justifying the conjecture that the putrefactive stage had fully commenced. The severer symptoms did not make their appearance till the day after the fish had been eaten; but in ordinary cases vomiting soon comes on, and it is, therefore, not improbable that death is averted in many instances by the readiness with which the stomach rejects the poison.”—“ The most direct means of relief consists of assisting nature in her efforts—first, by unloading the stomach with emetics and exhibiting brisk cathartics.”

Dr Thomas, speaking of the doubtful existence of copper-as banks in the West Indies, where fish of most deleterious qualities are very frequently met with, says (*c*) “ Even if

the fact was fully established, still it is well known that this substance or a solution of it, is inevitably fatal to all fish,"—"the longer the fish remains out of water, the more violent the poison becomes;"—"it is indeed a curious circumstance, that the same fish which is perfectly innocuous at one time, may be, and often is, highly pernicious at another."

The preceding remarks and quotations, which might have easily been more extended, from the best authorities, will, it is hoped, prove satisfactorily that there is no foundation whatever for ascribing the late cases at Leith to the presence of copper in any of its forms in the Dock mussels; and my research on this interesting subject will be fully repaid if I have conveyed my views in such a manner as to carry conviction along with them.

73, CONSTITUTION STREET,
LEITH, *August 7th*, 1827.

